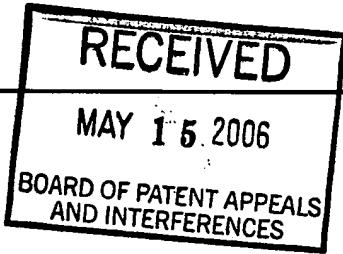


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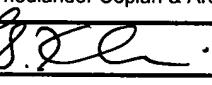
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Total Number of Pages in This Submission	Application Number	10/082,833
	Filing Date	02/25/2002
	First Named Inventor	GRAVES, S. et al.
	Art Unit	2874
	Examiner Name	PAK, S.H.
Attorney Docket Number		P00079US2A

## ENCLOSURES (Check all that apply)

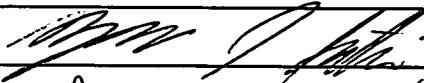
<input checked="" type="checkbox"/> Fee Transmittal Form <input checked="" type="checkbox"/> Fee Attached  <input type="checkbox"/> Amendment/Reply <input type="checkbox"/> After Final <input type="checkbox"/> Affidavits/declaration(s)  <input type="checkbox"/> Extension of Time Request <input type="checkbox"/> Express Abandonment Request <input type="checkbox"/> Information Disclosure Statement  <input type="checkbox"/> Certified Copy of Priority Document(s) <input type="checkbox"/> Reply to Missing Parts/ Incomplete Application <input type="checkbox"/> Reply to Missing Parts under 37 CFR 1.52 or 1.53	<input type="checkbox"/> Drawing(s) <input type="checkbox"/> Licensing-related Papers  <input type="checkbox"/> Petition <input type="checkbox"/> Petition to Convert to a Provisional Application <input type="checkbox"/> Power of Attorney, Revocation <input type="checkbox"/> Change of Correspondence Address  <input type="checkbox"/> Terminal Disclaimer <input type="checkbox"/> Request for Refund  <input type="checkbox"/> CD, Number of CD(s) _____ <input type="checkbox"/> Landscape Table on CD	<input type="checkbox"/> After Allowance Communication to TC <input type="checkbox"/> Appeal Communication to Board of Appeals and Interferences <input checked="" type="checkbox"/> Appeal Communication to TC (Appeal Notice, Brief, Reply Brief) <input type="checkbox"/> Proprietary Information <input type="checkbox"/> Status Letter <input checked="" type="checkbox"/> Other Enclosure(s) (please identify below): <input type="checkbox"/> Return Receipt Postcard
<b>Remarks</b> Appeal Communication to TC = Reply Brief Fee Attached = PTO 2038		
 <b>MAY 15 2006</b> <b>BOARD OF PATENT APPEALS AND INTERFERENCES</b>		

## SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

Firm Name	Benesch Friedlander Coplan & Aronoff, LLP		
Signature			
Printed name	Gregory S. Kolocouris		
Date	May 10, 2006	Reg. No.	47,714

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# FEE TRANSMITTAL

## For FY 2006

 Applicant claims small entity status. See 37 CFR 1.27

TOTAL AMOUNT OF PAYMENT (\$)

500.00

## Complete if Known

Application Number	10/082,833
Filing Date	February 25, 2002
First Named Inventor	GRAVES, S. et al.
Examiner Name	PAK, S.H.
Art Unit	2874
Attorney Docket No.	P00079US2A

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## FEE CALCULATION (All the fees below are due upon filing or may be subject to a surcharge.)

## 1. BASIC FILING, SEARCH, AND EXAMINATION FEES

Application Type	FILING FEES		SEARCH FEES		EXAMINATION FEES	
	Fee (\$)	Small Entity	Fee (\$)	Small Entity	Fee (\$)	Small Entity
Utility	300	150	500	250	200	100
Design	200	100	100	50	130	65
Plant	200	100	300	150	160	80
Reissue	300	150	500	250	600	300
Provisional	200	100	0	0	0	0

## 2. EXCESS CLAIM FEES

## Fee Description

		Small Entity
Each claim over 20 (including Reissues)		50
Each independent claim over 3 (including Reissues)		200
Multiple dependent claims		360

Total Claims	Extra Claims	Fee (\$)	Fee Paid (\$)	Multiple Dependent Claims	Fee (\$)	Fee Paid (\$)
- 20 or HP =	x	=				

HP = highest number of total claims paid for, if greater than 20.

Indep. Claims	Extra Claims	Fee (\$)	Fee Paid (\$)		
- 3 or HP =	x	=			

HP = highest number of independent claims paid for, if greater than 3.

## 3. APPLICATION SIZE FEE

If the specification and drawings exceed 100 sheets of paper (excluding electronically filed sequence or computer listings under 37 CFR 1.52(e)), the application size fee due is \$250 (\$125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).

Total Sheets	Extra Sheets	Number of each additional 50 or fraction thereof	Fee (\$)	Fee Paid (\$)
- 100 =	/ 50 =	(round up to a whole number) x	=	

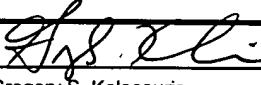
## 4. OTHER FEE(S)

Non-English Specification, \$130 fee (no small entity discount)

Other (e.g., late filing surcharge): Fee to File Reply Brief

500.00

## SUBMITTED BY

Signature		Registration No. (Attorney/Agent) 47,714	Telephone (216) 363-4453
Name (Print/Type)	Gregory S. Kolocouris		Date May 10, 2006

This collection of information is required by 37 CFR 1.136. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 30 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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REPLY BRIEF

Serial No.: 10/082,833

Title: OPTICAL TRANSMISSION TUBE AND APPLICATIONS THEREOF

**PATENT**

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re application of	:	GRAVES, S. et al.	Examiner	:	PAK, S. H.
Application No.	:	10/082,833	Group Art	:	2874
Filing Date	:	February 25, 2002	Docket No.	:	P00079US2A
Confirmation No.	:	4638			
Title	:	OPTICAL TRANSMISSION TUBE AND APPLICATIONS THEREOF			

Appeal Related Matters

Board of Patent Appeals and Interferences  
United States Patent and Trademark Office  
P.O. Box 1450  
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**REPLY BRIEF**

Sir/Madam:

Pursuant to 37 C.F.R. § 41.41, Appellant submits this Reply Brief in connection with the above-referenced application. This Reply Brief, filed within two months of the Examiner's Answer with a proper certificate of mailing, is timely filed. The fees required under 37 CFR § 41.20 are detailed and properly paid as stated in the accompanying Fee Transmittal Form.

The appeal is from the decision of the Examiner mailed February 7, 2005, finally rejecting claims 15-38, 40, 41, 43, and 44.

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**TABLE OF AUTHORITIES**

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Title: OPTICAL TRANSMISSION TUBE AND APPLICATIONS THEREOF

**I. STATUS OF CLAIMS**

Claims 15-38, 40, 41, 43, and 44, have been finally rejected under 35 U.S.C. § 103.

Claims 15-38, 40, 41, 43, and 44 remain pending and are on appeal.

**II. SUMMARY OF CLAIMED SUBJECT MATTER**

The application relates to delineation marking systems that incorporate optical transmission tubes configured to illuminate the area in the vicinity of the optical transmission tubes.

The claimed subject matter includes at least one optical transmission tube assembly disposed on a delineation marker configured to outline at least a portion of the contour of a road. The optical transmission tube assembly includes an elongated body that is substantially transparent. In several claimed embodiments, the optical transmission tube assembly includes a light emitting diode (“LED”). In other claimed embodiments, the optical transmission tube assembly includes a reflective layer extending along at least a portion of the length of the elongated body.

The claimed subject matter also includes a method of guiding a vehicle driver along a road. This method includes the step of installing an optical transmission tube assembly along a portion of the road.

**III. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL**

Claims 15-38, 40, 41, 43, and 44 have been rejected under 35 U.S.C. § 103(a) as being obvious in light of U.S. Patent No. 6,592,245 to Tribelsky et al. (Exhibit B to the Appeal Brief, hereafter “Tribelsky ‘245”) in view of U.S. Patent No. 5,982,969 to Sugiyama et al. (Exhibit C to the Appeal Brief, hereafter “Sugiyama ‘969”). The Office acknowledges that Tribelsky ‘245 does not teach or suggest a reflective layer in strip form extending along the transmission tube or an LED. The Office relies on Sugiyama ‘969 to supply the missing limitations.

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**IV. ARGUMENT**

Claims 15-38, 40, 41, 43, and 44 are not obvious in light of Tribelsky '245 in view of Sugiyama '969 under 35 U.S.C. § 103.

**A. Brief Discussion of References**

Tribelsky '245 discloses several distinct embodiments of fiber optic systems and methods for illuminating an elongated indication path (abstract). In the only embodiment relevant to the present application, shown in Figure 6 (hereafter "the Figure 6 embodiment"), Tribelsky '245 teaches that side emitting optical fibers may be embedded in a road surface or employed along a road side barrier to illuminate a driver's path (col. 7, lines 56-61).

To illuminate the elongated indication path, Tribelsky '245 discloses the use of a side emitting optical fiber (col. 1, lines 12-20) and a high intensity light source (col. 5, lines 40-43). The side emitting optical fibers transmit light from one end to the other "in accordance with the conditions for total internal reflection" (col. 4, lines 64-67), while simultaneously allowing some portion of the transmitted light to escape along the length of the fiber through holographic grooves (col. 5, lines 15-21 and 59-67). Tribelsky '245 teaches that a single fiber or a bundle of fibers may be employed (col. 2, lines 53-55). However, the fibers of Tribelsky '245 each have a diameter "of about between one half millimeter and one millimeter" (col. 8, lines 32-34).

Sugiyama '969 describes an optical transmission tube having a transparent core for illuminating a short path (col. 4, lines 25-30). The optical transmission tube further includes a reflective strip along a portion of the length of the tube (col. 4, lines 30-31). The end of the tube is coupled to an LED, which supplies light to the optical transmission tube (col. 7, lines 36-44). Sugiyama '969 fails to teach an optical transmission tube assembly disposed on a delineation marker configured to outline at least a portion of the contour of a road.

**B. Law and Argument**

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation to modify or combine the references. Second, there must be a reasonable expectation of success. Finally, the prior art reference must teach or

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suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. MPEP § 2143.

Additionally, the proposed modification cannot render the prior art unsatisfactory for its intended purpose. MPEP § 2143.01. If the modification would render the prior art invention unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. *In re Gordon*, 733 F.2d 900 (Fed. Cir. 1984).

Furthermore, the fact that references can be combined or modified is not sufficient to establish *prima facie* obviousness. MPEP § 2143.01. The prior art must also suggest the desirability of the combination. *In re Mills*, 916 F.2d 680 (Fed. Cir. 1990).

Moreover, a reference does not anticipate a claim by merely disclosing each limitation. For a reference to anticipate, “[e]very element of the claimed invention must be literally present, *arranged as in the claim.*” *Richardson v. Suzuki Motor Co., Ltd.*, 868 F.2d 1226, 1236 (Fed. Cir. 1989) (emphasis added). In other words, if a reference is a “mere catalog of separate parts, in disregard of the part-to-part relationships set forth in the claims and that give the claims their meaning,” then the reference does not anticipate and the combination of embodiments is subject to the same § 103 requirements set forth above. *Lindemann Maschinenfabrik GMBH v. Am. Hoist & Derrick Co.*, 730 F.2d 1452, 1458-59 (Fed. Cir. 1984); *Litecubes, L.L.C. v. Northern Light Products, Inc.* 2005 WL 2144574, \*3 (E.D. Mo. 2005) (a copy of which is attached hereto as Exhibit A).

In the present case, the application specifically claims “a delineation marker configured to outline at least a portion of the contour of the road” (claims 15-26); “a delineation marker along at least a portion of the road to outline the contour of the road” (claims 27-33); “a structure configured to outline at least a portion of the contour of the road” (claims 34-38 and 39); and “one or more optical transmission tubes provided on one or more of the barrier walls, the optical transmission tubes configured to be illuminated to outline the travel path” (claims 41, 43, and 44). The only embodiment of Tribelsky '245 that arguably meets this limitation is the Figure 6 embodiment. To the extent that the Examiner relies on alternative embodiments to meet claim

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limitations, there must be sufficient suggestion or motivation to combine the embodiments and there must be a reasonable expectation of success.

In the Examiner's Answer, the Examiner relies on several embodiments of Tribelsky '245 in maintaining his rejection. As will be described in more detail below, the Examiner fails to make a *prima facie* showing that it would have been obvious to combine the Figure 6 embodiment of Tribelsky '245 with elements taught in the other embodiments of Tribelsky '245 not related to delineating a contour of a road. Moreover, the Examiner fails to make a *prima facie* showing that it would have been obvious to further combine the other embodiments of Tribelsky '245 with Sugiyama '969.

1. **Tribelsky '245 teaches away from the use of an LED as a light source**

In the Examiner's Answer, the Examiner submits that: (1) the high power light source of Tribelsky '245 is merely one example of a light source that can be used; (2) a high power light source is not necessarily a high intensity light source; and (3) the 2 kilometer fibers disclosed by Tribelsky '245 is merely one example of an optical fiber that can be used.

Tribelsky '245 does teach light sources ranging from 1-1000 Watts, including a high intensity, lower powered laser, and also teaches the use of short fibers. However, this discussion is in relation to embodiments not directed to road delineation markers, rather than the Figure 6 embodiment. Specifically, these embodiments are directed to fibers employed as an outline of a road sign, a body of a vehicle, or on the side of a helicopter. The Examiner must show some motivation to combine these elements with the Figure 6 embodiment. *See Lindemann*, 730 F.2d at 1458-59. Tribelsky '245 provided no such motivation.

Tribelsky '245, in fact, teaches away from such combinations. In the Background of the Invention, in relation to road delineation, Tribelsky '245 states:

According to any of these well known methods of illumination, the optical marking of an elongated indication path is *prohibitively expensive and cumbersome because a large number of light sources are required*, these well known methods include serial connection of a plurality of light sources (e.g. each light source is aligned to single light guide, fiber, or light conduits or lens or signs and signals) without the ability to efficiently combine their collective outputs for long distance high intensity optical marking or illumination.

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(Col. 1, lines 41-49) (emphasis added). Tribelsky '245 overcame these problems of prior short light guides by employing an elongated light guide of up to two kilometers in length in the Figure 6 embodiment (col. 7, lines 61-64). Tribelsky '245, therefore, teaches away from a Figure 6 embodiment employing short light guides, and the Examiner cannot show that there would have been motivation to combine the short light guides of the alternative embodiments of Tribelsky '245 with the Figure 6 embodiment.

A high intensity light source is *required* to maintain uniform illumination along a single light guide spanning two kilometers of a highway (col. 15, lines 18-23). Indeed, Tribelsky '245 discloses the use of a 1000 Watt lamp as a light source in connection with the Figure 6 embodiment (*id.*). Therefore, Tribelsky '245 teaches away from a low-intensity light source, such as an LED, for this application.

Because Tribelsky '245 teaches away from a low-intensity light source for a delineation marker system, the LED of Sugiyama '969 would impermissibly render the light guide of Tribelsky '245 unsuitable for its intended purpose. *See* MPEP § 2143.01. Although the Examiner is correct in stating that an LED has a *relatively* high intensity compared to traditional incandescent lamps, an LED would not generate sufficient light to illuminate a two kilometer light guide. As shown in Exhibit D of the Appeal Brief, 5-Watt LEDs were available in 2002 with efficiencies of 18-22 lumens per Watt (at 7). Accordingly, 5-Watt LEDs produced a maximum of approximately 110 lumens. A 50-Watt incandescent light bulb, by contrast, produces approximately 600 lumens (*id.*). Therefore, the Examiner cannot show that there would have been motivation to replace the high intensity micro wave fiber lamp or high intensity lasers of Tribelsky '245 (*see* col. 13, lines 13-15; col. 15, lines 18-23) with a light source that provides less than 20% of the output of a 50-Watt incandescent bulb. *See In re Gordon*, 733 F.2d 900 (Fed. Cir. 1984).

Additionally, the disclosure of a laser is insufficient motivation to combine an LED with Tribelsky '245, because a laser is not an LED (*see* Exhibit D of the Appeal Brief). Therefore, the teaching of lasers as a light source in Tribelsky '245 is irrelevant to claims 27-38, 40, 41, and 44, all of which expressly claim an LED.

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Additionally, claims 15-26, 34-38, 40, 41, 43, and 44 all expressly claim a reflective layer. The teaching of a laser as a light source in Tribelsky '245 is irrelevant to these claims as well, because a laser is a highly focused beam of light. There can be no reasonable expectation that a laser could be successfully combined with the claimed reflective strip to illuminate a light guide.

For these reasons, Appellant respectfully submits that the rejection of claims 27-38, 40, 41, 43, and 44 under 35 U.S.C. § 103 is improper and the claims are not rendered obvious by Tribelsky '245 in view of Sugiyama '969.

**2. Tribelsky '245 teaches away from the use of a reflective strip**

In the Examiner's Answer, the Examiner submits that: (1) the side emitting fiber of Tribelsky '245 does not transmit light via total internal reflection; (2) disposing a reflective strip on a fiber does not input light back into the side emitting fiber and does not transmit the light towards either ends of the fiber; and (3) Tribelsky '245 is not limited to a bundle of fibers.

**a. Tribelsky '245 expressly calls for total internal reflection**

The Examiner is technically correct that side emitting fibers do not employ total internal reflection, because light is emitted from the sides of the fibers. However, Tribelsky himself describes his invention as employing "a 'light guide'... for light to be guided through in accordance with the conditions for *total internal reflections* such as side emitting optical fiber having a holographic outer diameter (or holographically grooved cladding or layer/s or nominal optical diameter) for uniform light... delivery, distribution and/or illumination." (Col. 4, lines 64-67) (emphasis added). Regardless of the accuracy of Tribelsky's statement, the import is clear – light is reflected within the fiber due to intrinsic properties of the fiber itself, and light is only emitted through the holographic grooves. In light of these characteristics, the Examiner cannot show that adding a reflective layer to such a fiber would serve any useful purpose.

In sum, Tribelsky '245 discloses the use of holographic grooves to direct light radially outwards. The present application uses a reflective strip for that purpose. Because of the high index of refraction of the side-emitting fibers, the Examiner cannot show that there would have

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been a reasonable expectation that a reflective layer would successfully direct light radially outwards, regardless of whether the holographic grooves were present.

**b. A reflective strip inherently inputs light back into an optical transmission tube**

The Examiner is incorrect in asserting that a reflective layer does not input light back into the transmission tube in the claimed application. The reflective layer, as claimed, is a separate component from the rest of the optical transmission tube. Therefore, by definition, when light strikes the reflective layer, it is no longer in the material that constitutes the optical transmission tube. Claim 41 expressly states that “light is reflected and scattered by the reflecting layer to cause light to emerge from the optical transmission tube.” Such light must be inputted back into the optical transmission tube to meet this limitation.

Optical fibers, such as those disclosed in Tribelsky ‘245, have a very high index of refraction. In Tribelsky ‘245, light does not escape from the fiber except in the location of the holographic grooves. If a reflective layer were placed over a holographic groove, the high index of refraction would cause much of the light to be reflected off the fiber, rather than reenter the fiber. If light did reenter the fiber, the high index of refraction of the fiber would bend the light. Moreover, even if not all of the light traveled towards the ends of the fiber, as explained in Exhibit D of the Appeal Brief, the light would be dispersed due to the high index of refraction. Therefore, the Examiner cannot show that there would have been a reasonable expectation that a reflective layer extending along the optical fiber of Tribelsky ‘245 would successfully delineate the contour of a road.

**c. The single fiber embodiment of Tribelsky ‘245 is not relevant to the present application**

While Tribelsky ‘245 does teach the use of both bundles of fibers and single fibers, it further teaches that single fibers are only used in limited applications:

In applications where there is no requirement for complex bending and curving, the device of the present invention is embodied by a light guide containing a single graded index side emitting optical fiber. This graded index fiber has a cross section diameter of about between one half millimeter and one millimeter.

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(Col. 8, lines 29-34). Clearly, Tribelsky '245 does not teach the use of a single fiber to delineate a contour in a road, because a contour of a road is a complex curve. More importantly, a fiber with a maximum diameter of one millimeter would be ill-suited to delineate a portion of a road. For reference, a typical paper clip has a diameter of one millimeter. Therefore the Examiner cannot show that there would have been a reasonable expectation for a single fiber of such dimensions to successfully delineate a contour of a road.

Moreover, if a bundle of optical fibers are employed, as in the relevant Figure 6 embodiment of Tribelsky '245 (col. 8, lines 14-34), a reflective layer would serve no useful function. The Examiner has interpreted each optical fiber as "an elongated body that is substantially transparent" (Exhibit A, p. 3). If the reflective layer of Sugiyama '969 were provided on each side emitting optical fiber of Tribelsky '245, it would result in a plurality of reflective layers disposed throughout a bundle of optical fibers. The plurality of reflective layers would scatter light in multiple directions, rather than in a single direction. Accordingly, the Examiner's proposed modification would render Tribelsky '245 unsatisfactory for its intended purpose. *See* MPEP § 2143.01. Therefore, Examiner has failed to show that there would have been suggestion or motivation to make the proposed modification. *See In re Gordon*, 733 F.2d 900 (Fed. Cir. 1984).

For these reasons, Appellant respectfully submits that the rejection of claims 15-26, 34-38, 40, 41, 43 and 44 under 35 U.S.C. § 103 is improper and the claims are not rendered obvious by Tribelsky '245 in view of Sugiyama '969.

3. Tribelsky '245 teaches away from a substantially transparent transmission tube

In the Examiner's Answer, the Examiner submits that Tribelsky inherently discloses an elongated body that is substantially transparent because it discloses a side emitting optical fiber that conducts a light beam along the length of the fiber and emits light from the side of the fiber. These properties alone, however, do not inherently define a substantially transparent medium. A *translucent* fiber could also conduct a light beam along the length of the fiber and emit light from

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Title: OPTICAL TRANSMISSION TUBE AND APPLICATIONS THEREOF

the side of the fiber. The term "transparent" means more than simply an ability to conduct and emit light.

As explained above, optical fibers have a high index of refraction to promote internal reflection. In fact, but for holographic grooves that allows light to be emitted from the side of the fiber, the fiber would transmit light from end to end, via total internal reflection. Under these conditions – with or without the holographic grooves – the optical fibers cannot be said to be substantially transparent. The index of refraction of the optical fiber is such that light is dispersed by the fiber, and any image viewed through the fiber would be virtually unrecognizable. Such a fiber cannot be said to be substantially transparent.

For this reason, Appellant respectfully submits that the rejection of claims 15-38, 40, 41, 43 and 44 under 35 U.S.C. § 103 is improper and the claims are not rendered obvious by Tribelsky '245 in view of Sugiyama '969.

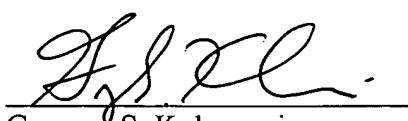
**CONCLUSION**

Appellant submits that the pending claims are allowable and urges allowance of the claims at an early date.

The Commissioner is hereby authorized to charge any additional fees, or credit any overpayment, to Deposit Account No. 02-2051, referencing Attorney Docket No. P00079US2A.

Respectfully submitted,

Dated: May 10, 2006

By:   
Gregory S. Kocolouris  
Registration No. 47,714

**BENESCH, FRIEDLANDER,  
COPLAN & ARONOFF, LLP**  
2300 BP Tower  
200 Public Square  
Cleveland, OH 44114  
Direct Dial: (216) 363-4453